

The opinion in support of the decision being entered today is
not binding precedent of the Board.

UNITED STATES PATENT AND TRADEMARK OFFICE

BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES

Ex parte ANDREW JAY SKOOG,
JANE ANN MURPHY and
TIMOTHY RAY LATTIRE

Appeal 2007-2158
Application 10/726,357
Technology Center 1700

Decided: July 6, 2007

Before EDWARD C. KIMLIN, THOMAS A. WALTZ, and
CATHERINE Q. TIMM, *Administrative Patent Judges*.

KIMLIN, *Administrative Patent Judge*.

DECISION ON APPEAL

This is an appeal from the final rejection of claims 1-22. Claim 1 is
illustrative:

1. A method of applying a heat-rejection coating, comprising the
steps of:

supplying a component of a gas turbine engine having an outer ceramic surface;

providing a reflective-coating mixture, wherein the reflective-coating mixture comprises a metallic pigment and an evaporable carrier;

applying the mixture to the outer ceramic surface by a method selected from the group consisting of air-assisted spraying, airless spraying, brushing, and decal transfer; and

firing the component having the reflective-coating mixture thereon to form a reflective coating on the ceramic component.

The Examiner relies upon by the following references as evidence of obviousness:

| | | |
|-----------|-----------------|---------------|
| Houshiyun | JP 60081892 A | May 9, 1985 |
| Klabunde | US 4,877,647 | Oct. 31, 1989 |
| Demaray | US 4,676,994 | Jun. 30, 1994 |
| Vakil | US 5,407,705 | Apr. 18, 1995 |
| Nagaraj | US 5,545,437 | Aug. 13, 1996 |
| Tecle | US 5,922,403 | Jul. 13, 1999 |
| Skoog | US 6,210,791 B1 | Apr. 3, 2001 |
| Rigney | US 6,455,167 B1 | Sep. 24, 2002 |
| Skoog | US 6,720,034 B2 | Apr. 13, 2004 |

Eppler, Richard A., "Ceramic Coatings" Engineered Materials Handbook, 4, ASM International, 953-956, 1991.

Kirk-Othmer, Encyclopedia of Chemical Technology, 22, 4th Ed., John Wiley & Sons, 670-690.

Appellants' claimed invention is directed to a method of applying a heat-rejection coating on an outer ceramic surface of a component of a gas turbine engine. The reflective-coating comprises a mixture of a metallic pigment and evaporable carrier, and is applied to the ceramic surface by one

of air-assisted spraying, airless spraying, brushing, and decal transfer. The coated surface is subjected to firing after the application of the reflective-coating mixture.

Appealed claims 1-5 stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 2, 4-6, and 7 of US Patent No. 6,720,034 to Skoog; claims 1-9 and 16-18 also stand rejected under the judicially created doctrine of obviousness-type double patenting over claims 1-16 of US Patent No. 6,720,034 in view of Rigney. In addition, the appealed claims stand rejected under 35 U.S.C. § 103(a) as follows:

(a) claims 1-6, and 8 over Nagaraj in view of Klabunde, Kirk-Othmer and Rigney;

(b) claim 7 over the stated combination of references further in view of Vakil;

(c) claim 9 over the stated combination of references further in view of Eppler;

(d) claim 10 over the stated combination of references further in view of Tecle;

(e) claims 11-13 over the stated combination of references further in view of Houshiyun;

(f) claims 14 and 15 over the stated combination of references further in view of Skoog '791; and,

(g) claims 16-22 over the stated combination of references further in view of Demaray.

With respect to the double patenting rejections and the § 103 rejection of claims 1-6 and 8, Appellants do not set forth an argument that is

reasonably specific to any particular claim. Accordingly, the claims subject to these rejections stand or fall together with claim 1.

We have thoroughly reviewed each of Appellants' arguments for patentability. However, we are in complete agreement with the Examiner's reasoned analysis and application of the prior art, as well as his cogent and thorough disposition of the arguments raised by Appellants. Accordingly, we will adopt the Examiner's reasoning as our own in sustaining the rejections of record, and we add the following for emphasis only.

We consider first the Examiner's double patenting rejections which are based on the patent to Skoog'034. Skoog, like Appellants, claims a method of applying a heat-rejection coating to the outer surface of a component of a gas turbine engine wherein the heat-rejection coating comprises a mixture of a metallic pigment and an evaporable carrier. Skoog also claims applying the heat-rejection coating by one of the cited techniques and firing the component of the engine after application of the reflective-coating mixture. Appellants contend that Skoog "is directed to a method of applying a heat rejection coating to a metallic component of a gas turbine engine [whereas] [i]n contrast, the present invention is directed to applying the heat rejection coating to a ceramic component" (Br. 7, second para.). However, as pointed out by the Examiner, claim 7 of Skoog specifically recites applying a ceramic barrier coating onto the component of the engine "before the step of applying the reflective-coating mixture" and then "applying the reflective-coating mixture after the ceramic barrier coating applied to the component."

Consequently, we find no patentable distinction between the claimed application of a reflective-coating mixture to the outer ceramic surface of an engine component and Skoog's claim to applying the same reflective-coating mixture to a ceramic barrier coating on the engine component. Manifestly, Skoog's claimed engine component having a ceramic coating thereon meets Appellants' claim requirement of a component of a gas turbine engine having an outer ceramic surface. We totally reject Appellants' argument that claim 7 of Skoog, which depends on claim 1, requires supplying a metallic component rather than the presently claimed "supplying a component of a gas turbine engine having an outer ceramic surface." We agree with the Examiner that once the method of Skoog's claim 7 applies a ceramic coating onto the engine component, an engine component having an outer ceramic surface is supplied. Although Rigney provides additional evidence that it would have been obvious for one of ordinary skill in the art to deposit the heat-reflective coating of Skoog onto an outer ceramic surface of an engine component, we hardly find Rigney necessary for supporting the Examiner's conclusion of obviousness.

We now turn to the § 103 rejections. Appellants do not dispute the Examiner's factual determination that Nagaraj teaches a method of applying a heat-reflective coating "on a nickel-based superalloy component of a gas turbine engine by applying a ceramic thermal barrier coating onto the substrate by plasma spraying and then applying the heat reflecting layer of gold or platinum on the thermal barrier coating (Col. 3, line 26-Col. 4, line 24)" (Answer 6, last para.). As acknowledged by the Examiner, while Nagaraj "teaches that the heat-reflecting layer can be applied by any

conventional deposition technique (Col. 3, lines 49-57)" (*id.*), the reference does not specifically teach any of the presently claimed application techniques. However, Klabunde teaches the method of forming a reflective layer on a substrate by spraying a dispersion of metal particles, such as gold or platinum, and a solvent carrier onto the substrate followed by firing (*see* col. 3, lines 35-65 and col. 6, lines 30-54). Hence, based on the combined teachings of Nagaraj and Klabunde alone, we find that it would have been obvious for one of ordinary skill in the art to employ Appellants' air-assisted spraying or airless spraying in the application of Nagaraj's heat-reflective coating.

While the Examiner acknowledges that Klabunde does not teach an air-assisted spraying technique, claim 1 on appeal does not require such since airless spraying is also recited. In any event, Kirk-Othmer firmly establishes the obviousness of employing air-assisted spraying as well in Nagaraj/s application of the heat-reflective coating. Also, while Nagaraj prefers applying the heat-reflective coating on a nickel-based superalloy, we agree with the Examiner that Rigney evidences the obviousness of utilizing a ceramic thermal barrier coating to insulate the substrate from high temperature.

Appellants acknowledge that "Nagaraj teaches that his mixtures 'can be readily deposited' (col. 3, line 60) and mentions 'conventional deposition techniques' (col. 3, line 56)," but Appellants maintain that the reference "has no teaching of a method for applying a reflective-coating mixture" (Br. 12, last para.). However, Appellants fail to explain why any of the application methods recited in claim 1 on appeal would not have been considered by one

of ordinary skill in the art as one of the conventional deposition technique taught by Nagaraj.

We do not understand Appellants' argument that "Nagaraj does not teach or suggest providing a reflective-coating" (Br. 13, second para.). The reference expressly discloses that "the heat shield is formed as a reflective coating **16** which forms a reflective surface **18** on the insert **10**, as shown in FIG. 1" (col. 3, lines 42-44). As for Appellants' argument that "the present invention recites only applying a reflective coating mixture, not both a reflective coating mixture and thermal barrier coating" (id.), the Examiner properly notes that the "comprising" language of the appealed claims embraces the application of both such coatings.

Appellants also maintain that the spraying techniques cited in Kirk-Othmer "with respect to atomizers appears directed to the internal workings of the gas turbine, i.e., the injection of fuel inside the engine for combustion, not applying a coating to the surface of a gas turbine engine" (Br. 14, third para.). However, we concur with the Examiner that Kirk-Othmer, considered as a whole, "is directed to known and conventional spraying techniques and discloses, on page 688 in Table 2, air-atomizing spray is a known method of spraying coatings" (Answer 15, last para.). We note that Appellants have apprised us of no reason why one of ordinary skill in the art would have considered it unobvious to apply a heat-reflective coating by one of the known, claimed application techniques.

Appellants also state that they do not "know whether palladium, platinum, and/or gold colloidal metal dispersions as taught by Klabunde will yield a 'reflective-coating mixture' as claimed" (Br. 16, first para.).

However, we agree with the Examiner that one of ordinary skill in the art would have the reasonable expectation that a dispersion of metal particles, such as gold and platinum, would result in a reflective coating, particularly one having at least the non-specified degree of reflection that is within the broad scope of the appealed claims.

As for the separate § 103 rejections of various dependent claims, Appellants have not convinced us that the Examiner's rejections are in error.

As a final point, we note that Appellants base no argument upon objective evidence of non-obviousness, such as unexpected results, which would serve to rebut the inference of obviousness established by the applied prior art.

In conclusion, based on the foregoing and the reasons well stated by the Examiner, the Examiner's decision rejecting the appealed claims is affirmed.

No time period for taking any subsequent action in connection with this appeal may be extended under 37 C.F.R. § 1.136(a)(iv)(effective Sept. 13, 2004).

AFFIRMED

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